

CLAIMS

1. A cold cathode field emission display comprising a cathode panel having a plurality of cold cathode field emission devices and an anode panel which  
5 are bonded to each other in their circumferential portions,

wherein:

the anode panel comprises a substrate, a phosphor layer formed on the substrate, one electric  
10 supply line, and an anode electrode formed on the phosphor layer,

the anode electrode is constituted of anode electrode units in the number of  $N$  ( $N \geq 2$ ),

each anode electrode unit is connected to an  
15 anode-electrode control circuit through said electric supply line, and

$V_A/L_g < 1$  (kV/ $\mu\text{m}$ ) is satisfied in which  $V_A$  (unit:kilovolt) is a voltage difference between an output voltage of the anode-electrode control circuit  
20 and a voltage applied to the cold cathode field emission device, and  $L_g$  (unit: $\mu\text{m}$ ) is a gap length between the anode electrode units.

2. The cold cathode field emission display  
25 according to claim 1, wherein:

a gap is provided between each anode electrode unit and the electric supply line, and

each anode electrode unit and the electric supply line are connected through a resistance element.  
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3. The cold cathode field emission display according to claim 2, wherein the electric supply line is constituted of electric supply line units in the number of  $M$  ( $2 \leq M \leq N$ ) connected in series through second  
35 resistance elements and one electric supply line unit is connected to one or at least two anode electrode units.

4. The cold cathode field emission display according to claim 1, wherein a stripe-shaped transparent electrode connected to the anode-electrode control circuit is formed between the phosphor layer and  
5 the substrate.

5. The cold cathode field emission display according to claim 4, wherein:  
a plurality of unit phosphor layers, each constituting  
10 one picture element, are arranged in the form of a straight line and

a stripe-shaped transparent electrode connected to the anode-electrode control circuit is formed between a column constituted of a plurality of  
15 the unit phosphor layers arranged in the form of a straight line and the substrate.

6. The cold cathode field emission display according to claim 1, wherein when the distance between  
20 the anode electrode unit and the cold cathode field emission device is  $d$  (unit:mm) and when the anode electrode unit has an area  $S$  (unit:mm<sup>2</sup>),  $(V_A/7)^2 \times (S/d) \leq 2250$  is satisfied.

25 7. The cold cathode field emission display according to claim 1, wherein a resistance layer is formed between the anode electrode units.

8. The cold cathode field emission display  
30 according to claim 7, wherein that edge portion of each anode electrode unit which does not face the adjacent anode electrode unit is covered with a resistance layer.

9. The cold cathode field emission display  
35 according to claim 7, wherein:  
a gap is provided between each anode electrode unit and the electric supply line, and

each anode electrode unit and the electric supply line are connected through a resistance element.

10.       The cold cathode field emission display  
5 according to claim 9, wherein the electric supply line is constituted of electric supply line units in the number of M ( $2 \leq M \leq N$ ) connected in series through second resistance elements and one electric supply line unit is connected to one or at least two anode electrode units.

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11.       The cold cathode field emission display  
according to claim 7, wherein a stripe-shaped transparent electrode connected to the anode-electrode control circuit is formed between the phosphor layer and  
15 the substrate.

12.       The cold cathode field emission display  
according to claim 11, wherein:  
a plurality of unit phosphor layers, each constituting  
20 one picture element, are arranged in the form of a straight line and

          a stripe-shaped transparent electrode  
connected to the anode-electrode control circuit is  
formed between a column constituted of a plurality of  
25 the unit phosphor layers arranged in the form of a straight line and the substrate.

13.       The cold cathode field emission display  
according to claim 7, wherein when the distance between  
30 the anode electrode unit and the cold cathode field emission device is  $d$  (unit:mm) and when the anode electrode unit has an area  $S$  (unit: $\text{mm}^2$ ),  $(V_A/7)^2 \times (S/d) \leq 2250$  is satisfied.

35 14.       A cold cathode field emission display comprising a cathode panel having a plurality of cold cathode field emission devices and an anode panel which

are bonded to each other in their circumferential portions,

wherein:

the anode panel comprises a substrate, a  
5 phosphor layer formed on the substrate, one electric supply line, and an anode electrode formed on the phosphor layer,

the anode electrode is constituted of anode electrode units in the number of  $N$  ( $N \geq 2$ ),

10 each anode electrode unit is connected to an anode-electrode control circuit through said electric supply line, and

$(V_A/7)^2 \times (S/d) \leq 2250$  is satisfied in which  $d$   
(unit:mm) is a distance between the anode electrode unit  
15 and the cold cathode field emission device, and  $S$   
(unit:mm<sup>2</sup>) is an area of the anode electrode unit.

15. The cold cathode field emission display according to claim 14, wherein:

20 a gap is provided between each anode electrode unit and the electric supply line, and

each anode electrode unit and the electric supply line are connected through a resistance element.

25 16. The cold cathode field emission display according to claim 15, wherein the electric supply line is constituted of electric supply line units in the number of  $M$  ( $2 \leq M \leq N$ ) connected in series through second resistance elements and one electric supply line unit is  
30 connected to one or at least two anode electrode units.

17. The cold cathode field emission display according to claim 14, wherein a stripe-shaped transparent electrode connected to the anode-electrode  
35 control circuit is formed between the phosphor layer and the substrate.

18. The cold cathode field emission display according to claim 17, wherein:  
a plurality of unit phosphor layers, each constituting one picture element, are arranged in the form of a  
5 straight line and

a stripe-shaped transparent electrode connected to the anode-electrode control circuit is formed between a column constituted of a plurality of the unit phosphor layers arranged in the form of a  
10 straight line and the substrate.

19. The cold cathode field emission display according to claim 14, wherein a resistance layer is formed between the anode electrode units.

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20. The cold cathode field emission display according to claim 19, wherein that edge portion of each anode electrode unit which does not face the adjacent anode electrode unit is covered with a resistance layer.

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21. The cold cathode field emission display according to claim 19, wherein:

a gap is provided between each anode electrode unit and the electric supply line, and

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each anode electrode unit and the electric supply line are connected through a resistance element.

22. The cold cathode field emission display according to claim 21, wherein the electric supply line  
30 is constituted of electric supply line units in the number of M ( $2 \leq M \leq N$ ) connected in series through second resistance elements and one electric supply line unit is connected to one or at least two anode electrode units.

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23. The cold cathode field emission display according to claim 19, wherein a stripe-shaped transparent electrode connected to the anode-electrode

control circuit is formed between the phosphor layer and the substrate.

24. The cold cathode field emission display  
5 according to claim 23, wherein:  
a plurality of unit phosphor layers, each constituting one picture element, are arranged in the form of a straight line and

a stripe-shaped transparent electrode  
10 connected to the anode-electrode control circuit is formed between a column constituted of a plurality of the unit phosphor layers arranged in the form of a straight line and the substrate.

15 25. A cold cathode field emission display comprising a cathode panel having a plurality of cold cathode field emission devices and an anode panel which are bonded to each other in their circumferential portions,

20 wherein:

the anode panel comprises a substrate, a phosphor layer formed on the substrate, and an anode electrode formed on the phosphor layer,

the anode electrode is constituted of anode  
25 electrode units in the number of  $N$  ( $N \geq 2$ ),

a resistance layer is formed between the anode electrode units,

one anode electrode unit is connected to an anode-electrode control circuit, and

30  $V_A/L_g < 1$  (kV/ $\mu$ m) is satisfied in which  $V_A$  (unit:kilovolt) is a voltage difference between an output voltage of the anode-electrode control circuit and a voltage applied to the cold cathode field emission device, and  $L_g$  (unit: $\mu$ m) is a gap length between the  
35 anode electrode units.

26. The cold cathode field emission display

according to claim 25, wherein a stripe-shaped transparent electrode connected to the anode-electrode control circuit is formed between the phosphor layer and the substrate.

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27. The cold cathode field emission display according to claim 26, wherein:  
a plurality of unit phosphor layers, each constituting one picture element, are arranged in the form of a straight line and

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a stripe-shaped transparent electrode connected to the anode-electrode control circuit is formed between a column constituted of a plurality of the unit phosphor layers arranged in the form of a straight line and the substrate.

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28. The cold cathode field emission display according to claim 25, wherein when the distance between the anode electrode unit and the cold cathode field emission device is  $d$  (unit:mm) and when the anode electrode unit has an area  $S$  (unit:mm<sup>2</sup>),  $(V_A/7)^2 \times (S/d) \leq 2250$  is satisfied.

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29. The cold cathode field emission display according to claim 25, wherein that edge portion of each anode electrode unit which does not face the adjacent anode electrode unit is covered with a resistance layer.

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30. A cold cathode field emission display comprising a cathode panel having a plurality of cold cathode field emission devices and an anode panel which are bonded to each other in their circumferential portions,

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wherein:

the anode panel comprises a substrate, a phosphor layer formed on the substrate, and an anode electrode formed on the phosphor layer,

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the anode electrode is constituted of anode electrode units in the number of N ( $N \geq 2$ ),

a resistance layer is formed between the anode electrode units,

5 one anode electrode unit is connected to an anode-electrode control circuit,

$(V_A/7)^2 \times (S/d) \leq 2250$  is satisfied in which d (unit:mm) is a distance between the anode electrode unit and the cold cathode field emission device, and S  
10 (unit:mm<sup>2</sup>) is an area of the anode electrode unit.

31. The cold cathode field emission display according to claim 30, wherein a stripe-shaped transparent electrode connected to the anode-electrode  
15 control circuit is formed between the phosphor layer and the substrate.

32. The cold cathode field emission display according to claim 31, wherein:  
20 a plurality of unit phosphor layers, each constituting one picture element, are arranged in the form of a straight line and

a stripe-shaped transparent electrode connected to the anode-electrode control circuit is  
25 formed between a column constituted of a plurality of the unit phosphor layers arranged in the form of a straight line and the substrate.

33. The cold cathode field emission display  
30 according to claim 30, wherein that edge portion of each anode electrode unit which does not face the adjacent anode electrode unit is covered with a resistance layer.

34. A cold cathode field emission display  
35 comprising a cathode panel having a plurality of cold cathode field emission devices and an anode panel which are bonded to each other in their circumferential



portions,

wherein:

the anode panel comprises a substrate, a  
phosphor layer formed on the substrate, and an anode  
5 electrode formed on the phosphor layer,

the anode electrode is constituted of anode  
electrode units in the number of  $N$  ( $N \geq 2$ ), and

each anode electrode unit has a size that  
inhibits energy generated by a discharge taking place  
10 between the anode electrode unit and the cold cathode  
field emission device from vaporizing the anode  
electrode unit locally.

35. The cold cathode field emission display  
15 according to claim 34, wherein the anode electrode unit  
has a size that inhibits energy generated by a discharge  
taking place between the anode electrode unit and the  
cold cathode field emission device from vaporizing a  
portion of the anode electrode unit which portion has a  
20 size equivalent to one subpixel.

36. The cold cathode field emission display  
according to claim 34, wherein a resistance layer is  
formed between the anode electrode units.

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